

**REMARKS/ARGUMENTS**

Reconsideration of this application in light of the following comments is courteously solicited.

With regard to the rejection of claims 41-43 under 35 U.S.C. 112, first paragraph, Applicants wish to draw the examiner's attention to paragraph [0039] of the corrected Substitute Specification filed at the U.S. Patent and Trademark Office on April 30, 2004. There is clear disclosure in this paragraph of calculating the enlargement factor (f) by the formula to the fourth decimal place. It is respectfully submitted that the examiner's rejection of claims 41-43 under 35 U.S.C. 112, first paragraph is improper and should be withdrawn.

Applicants respectfully request the examiner to reconsider his rejection of claims 16-34 and 41-43 under 35 U.S.C. 103 as being unpatentable over Wohlwend 6,106,747 in view of Applicant's Exhibit A, the John Halloran letter submitted to the Patent Office on May 3, 2004.

Applicants find it amazing that the prosecution of the instant application has ranged from a starting point of "insufficient disclosure" to a now entered rejection based on "obviousness". The history of this application is actually quite telling.

On June 16, 2003 Examiner Fiorilla states on Page 2 second paragraph of his office action that "the specification does not enable one skilled in the art to make or use the invention because in order to make or use the invention one must determine the enlargement factor, which can not readily determined because there is no teaching how to determine the achievable relative density after sintering". Mr. Fiorilla is a materials scientist, and graduated at Penn State where Dr. Messing was one of his teachers in ceramic matters.

In response to this rejection Applicants submitted as exhibits three letters from experts, Dr. Messing, Dr. Sigmund, and Dr. Halloran, all of which were contrary to the opinion of Mr. Fiorilla and all indicated that the instant disclosure was sufficient to allow one skilled in the art to make and use the invention.

Now, a reading of the last office action issued February 23, 2006 indicates that the current examiner believes the invention to be disclosed in the Wohlwend patent. The Wohlwend patent was previously considered, applied by Examiner Fiorilla, and withdrawn as being state of the art after submission of arguments by Applicant's representative. Thus, prior art which was previously removed is now being applied, in hindsight, as a teaching for the instant invention. It appears that we have now come full circle and in four years are back to the rejection originally made by Mr. Fiorilla and already withdrawn by him.

The current office action now states that the Halloran letter (which was filed at the U.S. Patent and Trademark Office over two years ago) now forms a basis of a new grounds of rejection with Wohlwend. It is hard to believe that a letter which states that the instant application has sufficient disclosure to enable one to make and use the invention described can be said to raise a new ground of rejection with regard to a cited patent document which was previously discussed and removed as a reference. However this is the case.

The current examiner now cites two parts of the Wohlwend patent application, column 3 lines 24-42 and column 4 lines 51-54. Let us look to the actual teachings of the Wohlwend patent.

Wohlwend solves a problem of deformation and susceptibility to crackes (especially the fine margins) during a final sintering step (col. 1 lines 66-67, and col. 2, lines 1-22). He especially concludes that this is the major problem associated

with the fabrication of dental restorations and its affiliated processes using presintered members and sequently sintering this. Hence, he teaches the use of a "working stump or a work pack possing a shrinkage factor which is basically equal to that of the reconstructive material". This stump or pack might stabilize the reconstruction during subsequent treatment. Therefore the reference given by the patent examiner encompasses only a portion of the Wohlwend patent which he chose in the view of our patent application. The whole Wohlwend's procedure of preparing a working stump or a working pack with "basically equal shrinkage factor" is not needed according to the present invention. Hence our procedure is much simpler than Wohlwends. Wohlwend makes mandantory use of the working stump / pack, and sintering the combination of both.

Wohlwend's abstract already states that the working stump and working pack are produced "such that they are enlarged by a predetermined enlargement factor". This is the factor that is given in table in col. 5 lines 15 to 25. Furthermore, in the abstract, Wohlwend clear emphasis to sinter the combination of form (framework) AND working stump or working pack. He states the need of a basically equal shrinkage factor of the working stump or the working pack to the form (framework). In view of this need, his enlargement factors given in the table may make sense. For an approximate enlargement factor like for Wohlwends working package, guessing or oui ji board (patent office action Jan 10th, 2005, page 3) might work. In contrast the instant application is based on the enlargement factor compensating the sintering shrinkage Wohlwend's table does not discuss or give sufficient teaching.

Wohlwends uses the "basically equal to that of the reconstructive material" (for example col. 2, lines 14 to 16). Wohlwend also uses a preparation of the working stump and

working pack given in col. 4 lines 10 to 32 where he mixes water, acid, alcohol and the shavings to a paste. Using the knowledge that different materials of initial density densify differently the patent office can guess that this support will not work. However Wohlwend never linked the shrinkage to density.

The Examiner very clearly interprets Wohlwend's patent in view of the instant application as in neither of patent officer's citations of Wohlwends patent (col. 3, lines 24-42 and col. 4 lines 51-54) a final sintering step is mentioned nor it is mentioned a sintering of the enlarged framework to final dimensions.

The Examiner derives nicely the enlargement factor, page 5, which was said to be insufficiently disclosed in 2003. His mathematical derivation uses the teaching of our application to enlarge linearly which is not disclosed by Wohlwend.

The Examiner makes use of this instant patent applications teachings to interpretate Wohlwend. First of all, Wohlwend observes when working with presintered ceramics a fracture or a deformation especially at the thin margins during the sintering step. Controlling sintering process by the working packing is his invention, col. 4 lines 32 to 45. He solves this problem by protecting the form (framework) and teaches to a time consuming procedure of producing a working stump or working package of the same shrinkage as the form (framework), and after sintering separating crown from that said working stump / pack. Obvious is that Wohlwends procedure is much more complicated and in turn we use a much more simplified procedure during sintering. The examiner assumes that Wohlwend is sintering to final dimensions using an rough enlargement factor and embedding the form (framework) in a working package / stump that during sintering imposes already deformation due to different sintering behavior

(kinetics and or slightly different shrinkage). The invention of the instant application established a procedure using sintering without working stump and package showing no deformation or fracture at the fine margins.

Prior to the invention those skilled in the art believed that the thin portions shrinks differently during sintering than the bulk parts, and thus result in deformations and fractures - as Wohlwend stated. This proved to be a misbelieve.

The Examiner states that Wohlwend teaches an enlargement factor. However the only enlargement factor that Wohlwend refers is a "predetermined enlargement factor" which is in table col. 5 lines 15 to 25, and which is very rough given ("enlargement factor (ca)"). Wohlwend states that the enlargement factor is dependent on the pretreatment and only shows the temperature. Wohlwend doesn't give any hint on how to determine an enlargement factor which is central for his working stump or package nor a link to "density". If Wohlwend had made the link of enlargement factor to density he might have observed that the working stump or package produced using his procedure has a different shrinkage /enlargement as it's density is much different.

The examiner also assumes that Wohlwend teaches how to apply the enlargement factor. We can't find any teachings in the Wohlwend patent supporting this assumption of the patent officer on how to apply the enlargement factor. However in our application it is stated "enlarging the obtained data linearly in all directions by the enlargement factor (f) and thereby compensating precisely for the sinter shrinkage".

The examiner also assumes, unsupported by any part of Wohlwend patent, that it is sintered to a controlled final density. In contrast, Wohlwend states that the working pack is still remaining porosity. Is that remaining porosity the same as

for the form so that they shrink the same manner and have the same enlargement factor? Wohlwend never teaches what final density his forms and working stump and pack are sintered too. Therefore, the interpretation of the examiner is misleading that Wohlwend is disclosing the same. Wohlwend even did not disclose the type of enlargement that he intends to use. In the application it is disclosed a "linear enlargement in all direction".

The examiner overlooks that Wohlwend never discloses determination of an enlargement factor according to the special blank. However the application specifies to use an enlargement factor specified for the special blank. The application states to use an enlargement factor calculated per blank. There is no teaching for this in Wohlwends patent. Any interpretation of Wohlwends in this direction is based on the knowledge based on our patent application.

The examiner interprets the letter of Professor Dr. J. Halloran in view of the instant patent application and Wohlwends patent. First of all, after reading the patent application Professor Halloran states most important that "the enlargement factor as defined in the patent application, is specified well enough for one skilled in the art to make use of the invention."

Applicants never said that enlargement factors were not known or used in ceramic art. That ceramic shrinks during the final firing is well known since more than 1000 years. Hence ceramic engineers take enlargement factors into account so that they do not have too small components after sintering. Moulds, tools are used in massproduction and here components after sintering have allowance on the exact measure. Mass production also have as stated by Halloran the challenge of reproducibility of the dimensions and therefore cautions aims to

control starting density. Halloran says that density determination is in the art of ceramicist enlargement. Halloran doesn't specify how to calculate from initial and final densities AND enlarge linearly.

Dental crowns are individually and sintered to final dimensions (!) and are not dealt with mass produced good where we would have to change moulds or tools or cnc programs we do not need to control the initial density and the shrinkage. The invention approach is to measure the initial density as a means to enlarge and we do it for sake of precision on each blank! Halloran states that in order to get reproducibility of dimensions of the finished article one needs to control starting density. This is done in mass production where you have expensive moulds - however in production of individual goods and in our patent application we live with the starting density and take starting density into the calculation of enlargement factor.

Halloran and Wohlwend did not state that there are a lot of complicated models to calculate enlargement before sintering and distortion during sintering - especially before fabrication of any moulds these models are used, eg. FEA simulations. Or in massfabrication in lots of cases there is an allowance to do a final machining step in the dense sintered state. However in the application a simple calculation of enlargement is used which was found to work in dental application, and which gives the final dimension without a machining in the dense sinter state. The Examiner interprets Halloran and Wohlwend in view of our application, especially in his action on page 5, "it is deemed that the only possible computation that Halloran could have been referring to - assuming isotropic shrinkage". This statement is directly derived from the instant patent application, i.e., "enlarged linearly in all directions". It can be seen that the

application was clear and needed and that it differs from Wohlwend and Halloran.

Halloran writes "desired sintering density". The Examiner does not acknowledge the fact that Wohlwend doesn't teach anything to what density is being sintered. The Patent officer assumes in view of our patent that Wohlwend is sintering to full density. Wohlwend talks about "porous consistency" (col. 4 line 32) for the working stump / pack but remains unclear about the state of the crown. Halloran states that the sintered density varies from the pore free state (theoretical density) to any chosen degree of residual porosity: Wohlwend offers no teachings and therefore can't guarantee for any dimensional accuracy after sintering. Our claims teach the starting, the final density, the calculus of the enlargement factor and application of the enlargement factor (linear enlargement) all of this failing to find in Wohlwend. In summary, the examiner's rejection of the claims as currently pending is based on nothing more than a hindsight reconstruction. The Wohlwend now applied was clearly determined by the previous examiner the state of the art. The secondary reference, the letter to Halloran states that the instant application has sufficient disclosure to enable one skilled in the art to make same. There is nothing in either of the references to teach the calculation of an enlargement factor as claimed in the claims of the instant application. The examiner's rejection is nothing more than a hindsight reconstruction and belies the concept of a whole clause of 35 U.S.C. 103.

Applicants have spent numerous sources and efforts in prosecuting the instant application. The reference now applied by the examiner was applied over four years ago in the initial rejection and was distinguished at that time. Applicants respectfully request that the examiner now look at the



"teachings of these references" without the benefit of the teachings of the instant application. Applicants believe that once this is done the examiner will clearly see that the prior art does not teach, suggest, or render obvious the subject matter currently claimed.

In light of the foregoing, it is submitted that the instant application is in condition for allowance and an early indication of same is respectfully requested.

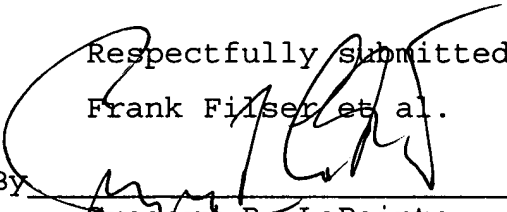
An earnest and thorough attempt has been made by the undersigned to resolve the outstanding issues in this case and place same in condition for allowance. If the Examiner has any questions or feels that a telephone or personal interview would be helpful in resolving any outstanding issues which remain in this application after consideration of this amendment, the Examiner is courteously invited to telephone the undersigned and the same would be gratefully appreciated.

It is submitted that the claims as amended herein patentably define over the art relied on by the Examiner and early allowance of same is courteously solicited.

If any fees are required in connection with this case, it is respectfully requested that they be charged to Deposit Account No. 02-0184.

Respectfully submitted,  
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Date: May 16, 2006

I, Rachel Piscitelli, hereby certify that this correspondence is being deposited with the United States Postal Service as Express Mail in an envelope addressed to: "Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313" on May 16, 2006.

